DOCUMENT RESUME

ED 256 493 PS 015 102

AUTHOR Schaefer, Earl S.; Edgerton, Marianna
TITLE Maternal Infancy Predictors of School Adaptation of Low-Income Children.
SPONS AGENCY National Inst. of Child Health and Human Development (NIH), Bethesda, Md.
PUB DATE 25 Apr 85
GRANT NICHD-1-R01-HD9003; NIMH-MH-35253
NOTE 19p.; Paper presented at the Biennial Meeting of the Society for Research in Child Development (Toronto, Ontario, Canada, April 25, 1985).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Academic Achievement; High Risk Students; Home Visits; Identification; *Infants; Interpersonal Competence; *Kindergarten Children; Longitudinal Studies; Low Income Groups; Models; *Mothers; Observation; *Parent Child Relationship; *Predictor Variables; Primary Education; *Student Adjustment; Verbal Ability
IDENTIFIERS *Parent Behavior

ABSTRACT

An analysis of longitudinal data on a sample of low-income mothers and children was conducted to identify maternal characteristics during pregnancy and infancy that predict child school adaptation during kindergarten. The sample consisted of low-income mothers recruited while receiving prenatal services from public health clinics. The children, who were without major biomedical problems at birth, were studied during kindergarten in two sequential cohorts. Kindergarten follow-up was completed for 239 children, or 74 percent of the initial sample of 321. Mothers were interviewed during the third trimester of pregnancy and at 4 months and 12 months postnatally. Data on the mothers' demographic and psychological characteristics were collected with three structured interviews during pregnancy and during their child's infancy. Data on child adaptive behavior in kindergarten and on promotion to first grade were collected from teacher ratings on the Classroom Behavior Inventory. A high level of mother-infant interaction was found to be correlated with child verbal intelligence and academic competence. Maternal behavior with the infant observed in a single home visit provided better prediction of child academic achievement in kindergarten than did maternal education and receptive vocabulary. The correlations of maternal cooperation with the interviewer and of maternal demographic and psychological characteristics with maternal behavior and with child academic competence suggest that those characteristics might contribute to the early identification of families of children at risk for low academic achievement. A bibliography and seven tables conclude the paper. (RH)

ED256493

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
X This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

Maternal Infancy Predictors of School Adaptation of Low-Income Children

Earl S. Schaefer and Marianna Edgerton

Department of Maternal and Child Health
and Frank Porter Graham Development Center
University of North Carolina at Chapel Hill
Chapel Hill, N.C. 27514

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
Earl S. Schaefer
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

Paper presented at Symposium on Early Predictors of School Problems in High Risk Populations
Sarale E. Cohen, Chair

Society for Research in Child Development Biennial Meeting
Toronto, Canada April 25, 1985

This research was supported by NICHD Grant No. 1-R01-HD9003 and NIMH Grant No. MH35253.

PS 015102

Maternal Infancy Predictors of School Adaptation of Low-Income Children

Earl S. Schaefer and Marianna Edgerton

The goal of this analysis of longitudinal data on a sample of low-income mothers and children is to identify maternal characteristics during pregnancy and infancy that predict child school adaptation during kindergarten. Extensive data collected from interviews with mothers and from observations of mother-child interaction are correlated with teacher ratings of child academic competence and social adjustment and with child grade retention during the kindergarten year. A two-dimensional circumplex model for maternal behavior that was reported earlier (Schaefer & Hunter, 1983) provides a parsimonious organization of data on mother-child interaction at four and twelve months postnatally. A three-dimensional spherical model for child behavior that has been replicated for several samples of children and for several teacher rating methods provides a parsimonious organization of teacher ratings of child behavior in the classroon (Schaefer & Edgerton, 1982; Schaefer, Edgerton, & Hunter, 1983, 1985). Mother-child interaction during infancy, maternal behavior with the interviewer, and maternal psychosocial and socioeconomic status variables are evaluated as predictors of teacher

ratings of child behavior and of grade retention during kindergarten.

Method:

The longitudinal sample consists of low-income mothers who were recruited while receiving prenatal services from public health clinics. Of the initial sample, 72% were black, 44% were married, and 40% had 12 or more years of education. The children who were without major biomedical problems at birth were studied during kindergarten in two sequential cohorts. Kindergarten follow-up was completed for 239 children, or 74% of the initial sample of 321 at birth.

Mothers were interviewed during the third trimester of pregnancy and at four months and twelve months postnatally. Observations and ratings of maternal behavior were completed from observation in the home of child care during bathing, dressing, and play at four and twelve months. Data on the mothers demographic and psychological characteristics were collected with three structured interviews during pregnancy and infancy. Data on child adaptive behavior in kindergarten and on promotion to first grade were collected from teacher ratings on the Classroom Behavior Inventory (Schaefer & Edgerton, 1978) and from school records.

Data analyses included tests of differences between the

35 children who were retained in kindergarten and the 204 children who were promoted to first grade. Correlations were computed of observations and ratings of maternal behavior and maternal demographic and psychological characteristics with teacher ratings of child adaptive behavior during kindergarten.

Results:

The data on maternal behavior are organized by a two-dimensional, circumplex model for mother-infant interaction (Schaefer & Hunter, 1983) that has been replicated by factor analyses of behavior observations during bathing, dressing, and play situations and from ratings on an Attachment Inventory at the end of the home visit both at four and at twelve months postnatally. The factor analyses of the ratings revealed a dimension of Interaction/Stimulation that had substantial loadings for clusters of items describing Achievement Press, Stimulation, Interaction, and Low Interaction while the second dimension was described by Punitiveness and Irritability. A sector of positive maternal behaviors within the two-dimensional model yielded a sequential order of neighboring of Responsiveness, Pleasure in Parenting, Interaction, Stimulation, and Achievement Press. Among scales for the negative sector the sequential order of neighboring was Low Interaction, Unresponsiveness, Insensitivity, Irritability, and

Punitiveness. Because in this study, as well as in other research, ratings of mother-child interaction show higher validity than observations, only the analyses of ratings are reported. However, observations show similar but lower relationships with child behavior in kindergarten.

A three-dimensional spherical model for child behavior in the classroom derived from factor analyses and multidemensional scaling analyses organizes the teacher ratings of child behavior in the classroom. The three dimensions are: I. Extraversion versus Introversion, II. Considerateness versus Hostility, and III. Academic Competence with high loadings on Verbal Intelligence and with substantial loadings for Curiosity/Creativity and Instrumental Independence.

Analysis of relationships among the child outcome variables in kindergarten revealed that the teacher rating scales that had substantial loadings on the child behavior factor of Academic Competence were substantially related to the child's grade promotion or retention in kindergarten (Table 1). The ratings that were most related to grade retention were Verbal Intelligence ($t=-5.22$; $p<.0001$), Distractibility ($t=-4.68$, $p<.0001$), Instrumental Independence ($t=4.38$, $p<.0001$), Curiosity/Creativity ($t=4.13$, $p<.0001$), Task-Orientation ($t=3.59$, $p<.0001$), and Instrumental Dependency ($t=-3.28$, $p<.01$). Thus grade

retention was substantially related to teacher ratings of child academic competence but was not significantly related to ratings of child social and emotional adjustment.

Correlations of mother-infant interaction with teacher ratings of child behavior in kindergarten showed significant correlations with child academic competence but insignificant correlations with child social and emotional adjustment (Table 2). Maternal behaviors of Achievement Press, Stimulation, Interaction and Low Interaction at four and twelve months postnatally had significant correlations with child academic competence scales, e. g., correlations of Stimulation at 12 months were highest with Verbal Intelligence ($r=.38$, $p<.0001$) and with Curiosity/Creativity ($r=.36$, $p<.0001$). Teacher ratings of child social and emotional behavior of Considerateness versus Hostility and Extraversion versus Introversion almost uniformly had low and insignificant correlations with maternal behavior during infancy. Similarly maternal behaviors during infancy of Punitiveness and Irritability had typically low and insignificant correlations with child social adjustment during kindergarten.

Maternal behavior scales of Interaction, Stimulation, and Achievement Press at four months were related to child promotion in kindergarten at the .01 level of significance and at twelve months at the .0001 level of significance

(Table 3). Maternal behavior scales of Punitiveness and Irritability during infancy had insignificant correlations with child promotion in kindergarten. Thus ratings of child academic competence and grade promotion during kindergarten were significantly correlated only with maternal interaction and stimulation variables during infancy.

The substantially intercorrelated interviewer ratings of the mother on cooperativeness, communicativeness, cheerfulness, and attractiveness of personality were summed, labeled cooperativeness, and correlated with teacher ratings of child behavior during kindergarten (Table 4). The interviewer ratings of maternal cooperativeness were significantly correlated with child competence scales, with highest correlations with Verbal Intelligence. Child grade promotion was also highly related with maternal cooperativeness during pregnancy ($t=4.61$, $p=<.0001$) and at twelve months postnatally ($t=4.19$, $p<.0001$) (Table 5). Thus maternal behavior with the interviewer, even before birth of the child, is significantly correlated with both teacher ratings of child academic competence and with grade promotion during kindergarten.

An earlier analysis of the first cohort of this study found significant correlations of mother-infant interaction variables with maternal behavior during the interview and with other maternal socioeconomic status and psychological

variables (Schaefer & Hunter, 1983). Those correlations have been replicated for the second cohort and for the entire sample. Maternal SES variables of family income and maternal education are significantly related to teacher ratings of child academic competence (Table 6) and to grade promotion (Table 7). Maternal receptive vocabulary, low external locus of control, and self-directing values for children are significantly correlated with teacher ratings of child Verbal Intelligence and with Curiosity/Creativity (Table 6). Grade promotion was also significantly related to low external locus of control and self-directing values for children but not to maternal receptive vocabulary (Table 8). However, child academic competence and grade promotion have higher correlations with mother-infant interaction variables at twelve months postnatally and with maternal cooperativeness with interviewer during pregnancy and at twelve months postnatally than with maternal demographic and psychological characteristics.

Discussion:

The organization of maternal behavior during infancy by dimensions of Interaction/Stimulation and of Punitiveness/Irritability and organization of child behavior during kindergarten by dimensions of Academic Competence, Considerateness versus Hostility, and Extraversion versus Introversion yield a highly integrated pattern of

correlations of maternal behavior during infancy with child behavior during kindergarten. Only the dimension described by observations of high levels of mother-infant interaction and by ratings of Achievement Press, Stimulation, and Interaction is significantly related to teacher ratings of child academic competence and to grade promotion. Teacher ratings of child conation or motivation on scales of Curiosity/Creativity, Independence, Task-Orientation, and Distractibility, as compared to ratings of Verbal Intelligence, have lower but significant correlations with mother-child interaction during infancy. In contrast, a dimension of maternal Punitiveness/Irritability during infancy has typically low and insignificant correlations with child behavior during kindergarten. Also, teacher ratings of child social adjustment during kindergarten have typically low and insignificant correlations with maternal behavior during infancy.

The major generalization of this study that a high level of mother-infant interaction is correlated with child verbal intelligence and academic competence is supported by several studies of mother-infant interaction and child intelligence (Clarke-Stewart, 1973; Cohen & Beckwith, 1979; Bee et al, 1982; Bradley & Caldwell, 1976). Although few data analyses report a lack of correlation of early maternal punitiveness/irritability with child adaptive behavior in

the classroom and a lack of prediction of child social adjustment in the classroom from early maternal behavior, reports that contradict those findings are also rare. Future studies might be designed to test the generalization that only a single major dimension of maternal-infant interaction predicts only a single dimension of teacher ratings of child intelligence and academic competence.

The findings of this study that data on maternal behavior with the infant from a single home visit provides better prediction of child academic achievement in kindergarten than maternal education and receptive vocabulary suggests that maternal behavior is an important mediator of the influence of maternal socioeconomic status and intelligence upon child competence (Bayley, 1970). The finding that ratings after the home visit have higher predictive validity than more detailed observations supports earlier research comparing observations and ratings (Bakeman & Brown, 1980; Lytton, 1974; Maccoby & Martin, 1983). Ratings of maternal behavior are a useful summary of clinical observations as well as a complement for detailed observation in research on mother-child interaction.

The correlations of maternal cooperation with the interviewer and of maternal demographic and psychological characteristics with maternal behavior and with child academic competence suggests that those characteristics

might contribute to identification of families of children at risk for low academic achievement during pregnancy as well as during the first year of life. The analysis of maternal behavior predictors of child competence might also contribute to identification of families, to development of goals, and to development of criteria of success for programs of early parent-centered intervention.

BIBLIOGRAPHY

Bakeman, R. & Brown, J. V. (1980). Early interaction: Consequences for social and mental development at three years. Child Development, 51, 437-447.

Bayley, N. (1970). Development of mental abilities. In Mussen. P.H. (Ed. Manual of Child Psychology Third Edition Volume 11. New York: John Wiley, 1163-1210.

Bee, H. L., Barnard, K. E., Eyres, S. J., Gray, C. A., Hammond, M. A., Spietz, A. L., Snyder, C., & Clark, B. (1982). Prediction of IQ and language skills from perinatal status, child performance, family characteristics and mother-infant interaction. Child Development, 53, 1134-1156.

Bradley, R. H. & Caldwell, B. M. (1976). The relation of infants' home environment to mental test performance at fifty-four months: A follow-up study. Child Development, 47, 1172-1174.

Clarke-Stewart, K. A. (1973). Interactions between mothers and their young children: Characteristics and consequences. Monographs of the Society for Research in Child Development, 38 (6-7, Serial No. 153).

Cohen, S. E., & Beckwith, L. (1979). Preterm infant interaction with the caregiver during the first year of life and competence at age two. Child Development, 50, 767-776.

Lytton, H. (1974). Comparative yield of three data sources in a study of parent-child interaction. Merrill-Palmer Quarterly of Behavior and Development, 20, 53-64.

Maccoby, E. E. & Martin, J. A. (1983). Socialization in the context of the family; parent-child interaction. In P. H. Mussen (Ed.), E. M. Hetherington (Vol. Ed.), Handbook of child psychology: Vol. 4. Socialization, personality, and social development (pp. 1-102). New York: Wiley.

Schaefer, E. S., & Edgerton, M. (1978). Classroom Behavior Inventory. Unpublished manuscript. The University of North Carolina at Chapel Hill.(available from Tests in Michrofiche, Educational Testing Service, Princeton, NJ 08541).

Schaefer, E. S., & Edgerton, M. (1982, August). Circumplex and spherical models for child school adjustment and competence. Paper presented at the meeting of the American Psychological Association, Washington, D.C.

Schaefer, E. S., Edgerton, M., & Hunter, W. (1983, August). A unified conceptual model for academic competence, social adjustment and psychopathology. Paper presented at the meeting of the American Psychological Association, Anaheim, CA. (ERIC no. ED235 895).

Schaefer, E. S., Edgerton, M., & Hunter, W. M. (1985, April). Spherical model integrating academic competence with social adjustment and psychopathology. Paper presented at the meeting of the Society for Research in Child Development, Toronto, Canada.

Schaefer, E. S., & Hunter, W. M. (1983, April). Mother-infant interaction and maternal psychosocial predictors of kindergarten adaptation. Paper presented at the annual meeting of the Society for Research in Child Development, Detroit, MI.

Table 1

T-Test of Teacher Ratings by Kindergarten Retention

Teacher Rating Scales[1]	Mean/Standard deviation repeaters (N=35)	non-repeaters (N=204)	t	p
Positive 5-item scales				
Extraversion	16.6/4.7	18.0/4.1	1.8	NS
Curiosity/Creativity	10.2/3.9	13.6/4.4	4.1	.0001
Independence	12.6/3.7	15.8/4.0	4.4	.0001
Verbal Intelligence	8.1/3.7	13.0/4.3	6.2	.0001
Task Orientation	11.8/4.2	15.0/4.9	3.6	.001
Considerateness	16.5/4.5	17.3/4.5	1.0	NS
Negative 3-item scales				
Introversion	7.8/2.5	6.7/2.7	-1.9	NS
Dependency	8.3/2.7	6.7/2.5	-3.3	.01
Distractibility	11.9/2.3	9.2/3.3	-4.7	.0001
Hostility	7.2/3.3	6.7/3.3	-0.9	NS

[1]Scales of the Classroom Behavior Inventory

BEST COPY AVAILABLE

BEST COPY AVAILABLE

Table 2

Correlations of Mother Behavior with Infant and Teacher Ratings in Kindergarten (N varied from 197 to 210)

Ratings of Mother-child Interactions	Kindergarten Teacher Ratings: Extraversion	Creativity	Verbal Intelligence	Independence	Task Orientation	Considerateness
4-month Ratings						
Responsiveness	-06	05	13	03	-02	01
Pleasure in Parenting	02	12	13	05	-03	07
Interaction	06	19	21	05	-05	02
Stimulation	07	23	27	09	08	02
Achievement Press	07	22	26	10	10	04
Low Interaction	-03	-17	-19	-06	-08	-06
Unresponsiveness	01	-12	-15	-06	-05	-05
Insensitivity	-02	-04	-09	-03	-05	-04
Irritability	02	07	01	-01	01	00
Punitiveness	12	08	02	04	06	07
12-month Ratings						
Responsiveness	02	17	22	15	07	02
Pleasure in Parenting	05	23	27	22	15	06
Interaction	08	32	36	28	19	10
Stimulation	11	36	38	27	18	07
Achievement Press	05	30	31	22	15	01
Low Interaction	-15	-37	-39	-33	-26	-15
Unresponsiveness	-06	-22	-26	-23	-17	-10
Insensitivity	02	-09	-14	-12	-08	-03
Irritability	05	-04	-10	-11	-10	-09
Punitiveness	10	05	-03	-01	-02	-08

Note: Decimal Points Omitted

Underlined values are significant < .05

BEST COPY AVAILABLE

Table 3

T-Test of Mother Behavior with Infant by Kindergarten Retention

Mother Behavior with Infant	Mean/Standard deviation		t	p
	Repeaters	Nonrepeaters		
Four months (N=29, 180)				
Responsiveness	55.6/10.4	60.8/10.1	2.6	.01
Pleasure in Parenting	35.0/6.7	37.7/7.4	1.9	NS
Interaction	36.0/8.3	40.9/9.4	2.6	.01
Stimulation	22.0/6.5	25.8/7.4	2.6	.01
Achievement Press	13.6/3.9	16.0/4.3	2.8	.01
Low Interaction	12.2/3.2	10.4/5.6	-1.7	NS
Unresponsiveness	19.3/9.9	16.6/11.0	-1.2	NS
Insensitivity	7.7/4.5	6.1/3.6	-1.8	NS
Irritability	9.0/5.4	6.9/4.6	-2.3	.05
Punitiveness	4.6/2.8	3.8/2.0	-1.6	NS
One Year (N=33, 187)				
Responsiveness	50.2/7.7	56.2/10.7	3.9	.001
Pleasure in Parenting	31.1/5.1	35.4/7.5	4.1	.0001
Interaction	31.2/6.3	38.3/8.6	5.6	.0001
Stimulation	19.4/5.7	25.5/6.8	4.8	.0001
Achievement	11.6/3.5	15.1/4.3	4.5	.0001
Low Interaction	13.9/5.0	10.3/5.1	-3.8	.001
Unresponsiveness	22.3/9.7	16.8/10.7	-3.0	.01
Insensitivity	8.4/3.1	7.0/3.7	-2.0	.05
Irritability	13.6/7.8	11.7/7.7	-1.3	NS
Punitiveness	8.7/4.0	7.7/3.8	-1.3	NS

BEST COPY AVAILABLE

BEST COPY AVAILABLE

Table 4

Correlations of Mother's Cooperativeness During Interview and Teacher Ratings in Kindergarten

Interviewer Ratings of Mothers Cooperativeness	Kindergarten Teacher Ratings: Extraversion	Creativity	Verbal Intelligence	Independence	Task Orientation	Considerateness
Pregnancy (N=225)	20	27	31	32	26	20
Four months (N=202)	14	21	19	15	09	09
Twelve months (N=211)	03	26	35	26	16	08

Table 5

T-test of Mother's Cooperativeness During Interview by Kindergarten Retention of Child

Interviewer Rating of Mother's Cooperativeness	Mean/Standard deviation: repeaters	nonrepeaters	t	p
Pregnancy (N=35, 202)	8.5/2.5	10.4/2.1	4.6	.0001
Four months (N=30, 181)	9.7/2.1	10.2/2.1	1.4	NS
Twelve months (N=33, 187)	8.7/1.6	10.1/1.8	4.2	.0001

Table 6

Correlations of Mother's Demographic and Personal Characteristics with Teacher Ratings in Kindergarten (N varies from 186 to 225)

Mother Characteristics	Kindergarten Teacher Ratings: Extraversion	Creativity	Verbal Intelligence	Independence	Task Orientation	Considerateness
Kindergarten Measures						
Family Income	06	15	19	12	05	05
Mother's Education	14	28	30	15	06	06
Pregnancy and Infancy Measures						
Mother's Receptive Vocabulary (PPVT)	13	23	30	17	08	-02
External Locus of Control (Sum of Pregnancy, 4 & 12 months)	-03	-18	-24	-08	03	00
Self-Directing Values (12 months)	11	18	19	10	-02	-03

BEST COPY AVAILABLE

BEST COPY AVAILABLE

Table 7

T-Test of Mother's Demographic and Personal Characteristics
by Kindergarten Retention

Mother Characteristic	Mean/Standard deviation: Repeaters (N=34)	Nonrepeaters (N=193)	t	p
Kindergarten Measures				
Family Income (N=35, 202)	2.0/1.1	2.7/1.6	3.1	.01
Mother's Education (N=34, 199)	11.5/1.7	11.6/1.3	3.7	.001
Pregnancy Infancy Measures				
Mother's Receptive Vocabulary (PPVT) (N=35, 202)	89.0/18.8	89.8/17.9	0.24	NS
External Locus of Control (Sum of Pregnancy, 4 & 12 months) (N=29, 165)	13.2/5.2	9.4/5.8	-3.3	.001
Self-Directing Values, 12 months (N=33, 189)	7.2/2.9	8.8/3.7	2.3	.05

BEST COPY AVAILABLE